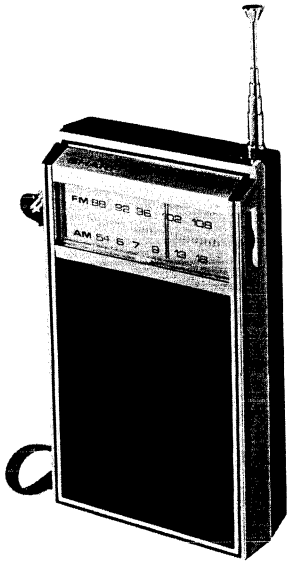
Service Manual

Sharp



MODEL

FX-184

SPECIFICATIONS

Frequency Range
- AM ..... 530 ~ 1650kHz
- FM ..... 88 ~ 108MHz

Intermediate Frequency
- AM 455kHz
- FM 10.7MHz

Power Output
- Undistorted ..... 200 mW
- Maximum ..... 350 mW

Speaker ..... 2 1/2″ (6 cm) P.D.S. 10 ohm 400 Hz

Power Supply ..... DC 6V (UM-3X4)

Dimensions ..... 3″ (W) X 5 1/8″ (H) X 1 1/8″ (D) (75(W) X 131(H) X 31(D) mm)

Weight ..... 0.53 lbs. (240 g)

Transistor Complement

Q1	2SC535A	FM RF Amp.
Q2	2SC461B	FM/AM Converter
Q3	2SA12C	AFC
Q4	2SC460C	1st IF Amp.
Q5	2SC460C	2nd IF Amp.
Q6	2SB75B	Audio Amp.
Q7	2SB75B	Audio Amp.
Q8, Q9	2SB77B×2	Audio Output

GENERAL DESCRIPTION

The circuitry used in this two band portable radio incorporates 8 transistors, 1 auxiliary transistor, 4 diodes, 1 thermistor.

A ferrite bar antenna feeds the AM signal to the AM converter, 2 IF amplifiers and a diode detector.

A telescopic rod antenna feeds the FM signal to the FM RF amplifier, FM converter, 2 IF amplifiers and FM detector (2 diodes).

The audio signal passes through the 4 transistor audio amplifier circuit.

An AM AVC voltage is fed back to the 1st IF amplifier. An AFC voltage is fed back to the FM converter.

CHASSIS REMOVAL

1. Remove the back cabinet.
2. As the printed circuit board is fixed into the slit of the cabinet, push open both sides of the cabinet and lift up the printed circuit board. Then the printed circuit board can be removed.

HAYAKAWA ELECTRIC CO., LTD.

OSAKA, JAPAN

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows;

1) Connect an output meter across the speaker voice coil lugs.
2) Set volume control for maximum.
3) Attenuate the signals from the generator enough to swing the most sensitive range of output meter.
4) Use a non-metallic alignment tool.
5) Repeat adjustments to insure good results.

AM ALIGNMENT CHART

Signal generator			Receiver		Adjust
Step	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	Connect signal generator through a 10k ohm resistor to the antenna tuning condenser. Ground lead to the receiver chassis.	Exactly 455kHz. (400Hz, 30%, AM modulated.)	Tuning gang fully open. (minimum capacity)	Adjust for maximum output on speaker voice coil lugs.	T5 T6 T7
2	Use radiating loop. Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup. Connect generator output to one end of this wire.	Exactly 600kHz. (400Hz, 30%, AM modulated)	600kHz.	Same as step 1	L6 & L5 See NOTE A.
3	Same as step 2.	Exactly 1600kHz. (400Hz, 30%, AM modulated.)	1600kHz.	Same as step 1.	C4 & C7 See NOTE A.
4	Repeat steps 2 and 3 until no further improvement is obtained.				

NOTE A

Check alignment of receiver antenna coil by bringing a piece of ferrite (such as a coil slug) near the antenna loop stick, then a piece of brass. If ferrite increases output, loop requires more inductance. If brass increases output, loop requires less inductance. Change loop inductance by sliding the bobbin toward the center of ferrite core to increase inductance, or away to decrease inductance.

FM ALIGNMENT CHART

Signal generator			Receiver		Adjust
Step	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	Connect signal generator through a 5PF capacitor to converter emitter, TP3. Connect generator ground lead to the receiver chassis.	Exactly 10.7MHz. (400Hz, 30%, AM modulated)	Tuning gang fully closed. (maximum capacity)	Connect VTVM between TP-7 and chassis ground.	Detune T3 & T4 Tune T1 & T2
2	Same as step 1.	Exactly 10.7MHz. (Unmodulated)	Same as step 1.	Same as step 1. See NOTE B.	See NOTE B.
3	Connect signal generator through a 75 ohm resistor including output impedance of signal generator to the telescopic rod antenna. Ground lead to the receiver chassis.	Exactly 88MHz. (400Hz, 30%, FM modulated)	88MHz.	Adjust for maximum output on speaker voice coil lugs.	L4 & L2
4	Same as step 3.	Exactly 108MHz. (400Hz, 30%, FM modulated)	108MHz.	Same as step 3.	C6 C5
5	Repeat steps 3 and 4 until no further improvement is obtained.				

NOTE B

1) Connect VTVM (0.1 volt range DC scale) between test point TP-4 and chassis ground.
2) Adjust T3 for 0 volt.
3) Change signal generator frequency 10.7MHz +100kHz and −100kHz approximately.
4) Adjust T4 for balanced peaks. Peak separation should be approximately 200kHz.

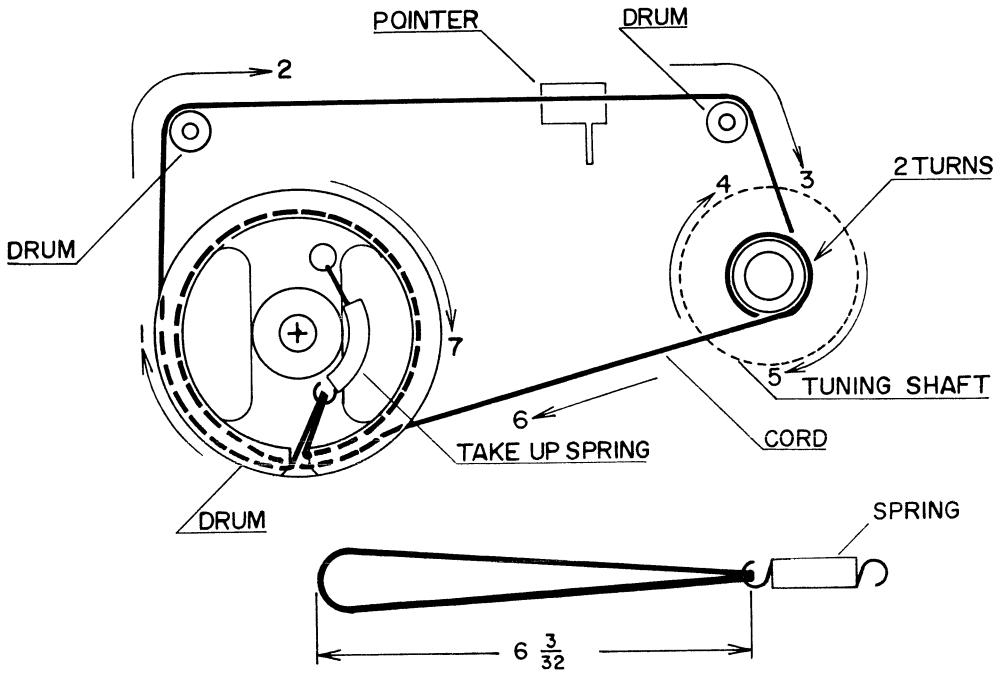


Figure 1 Dial Cord Stringing

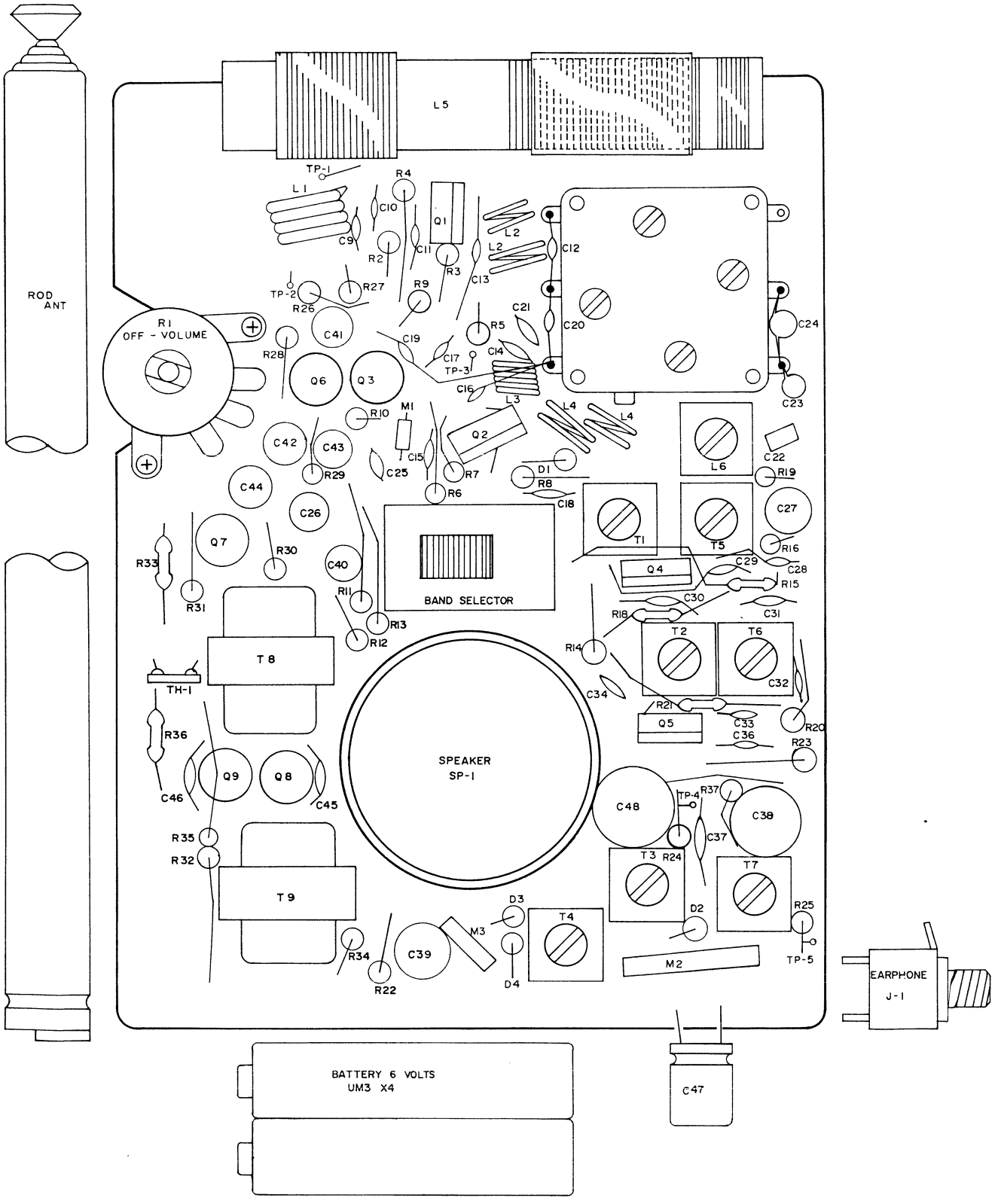


Figure 2 Printed Circuit Board (Top View)

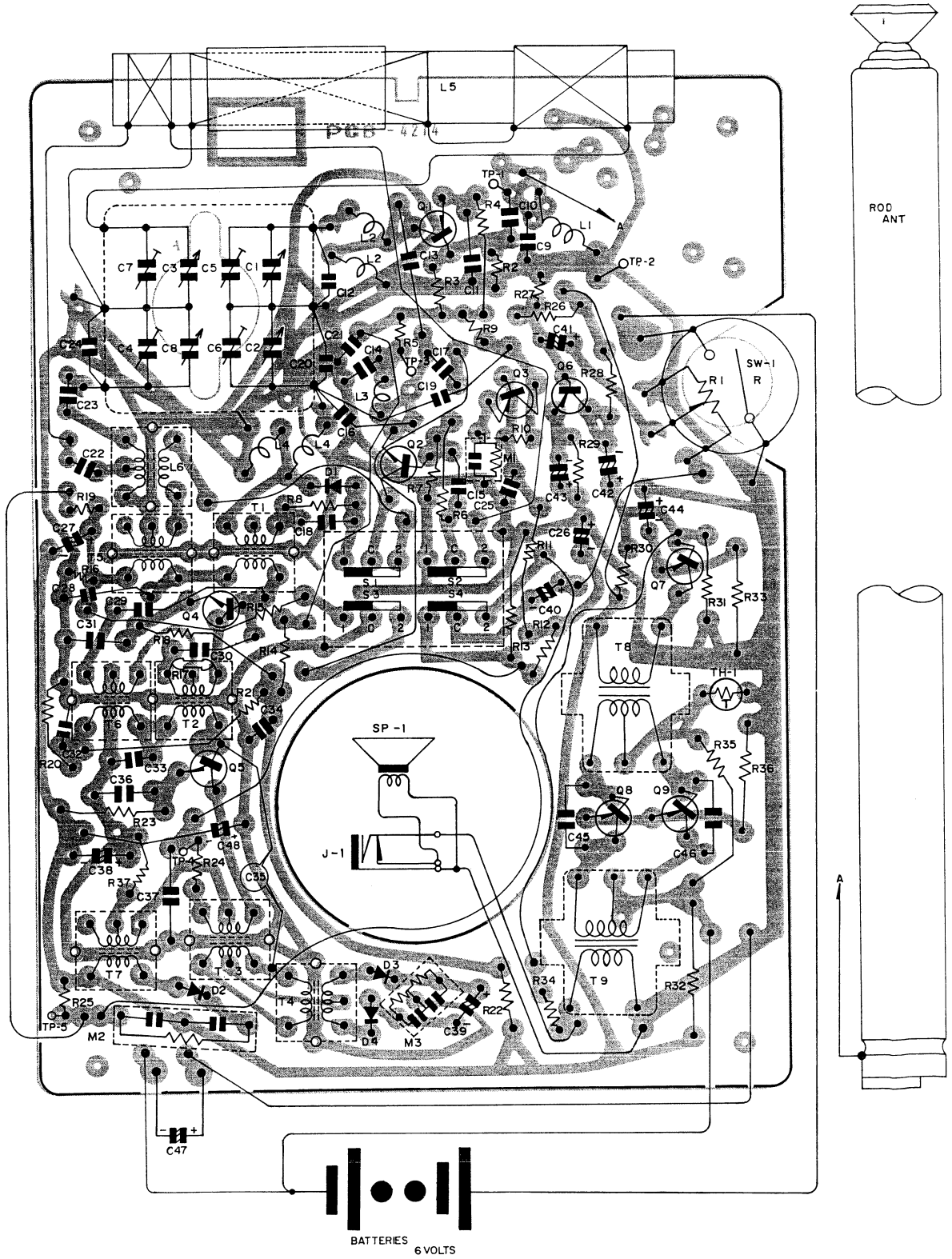


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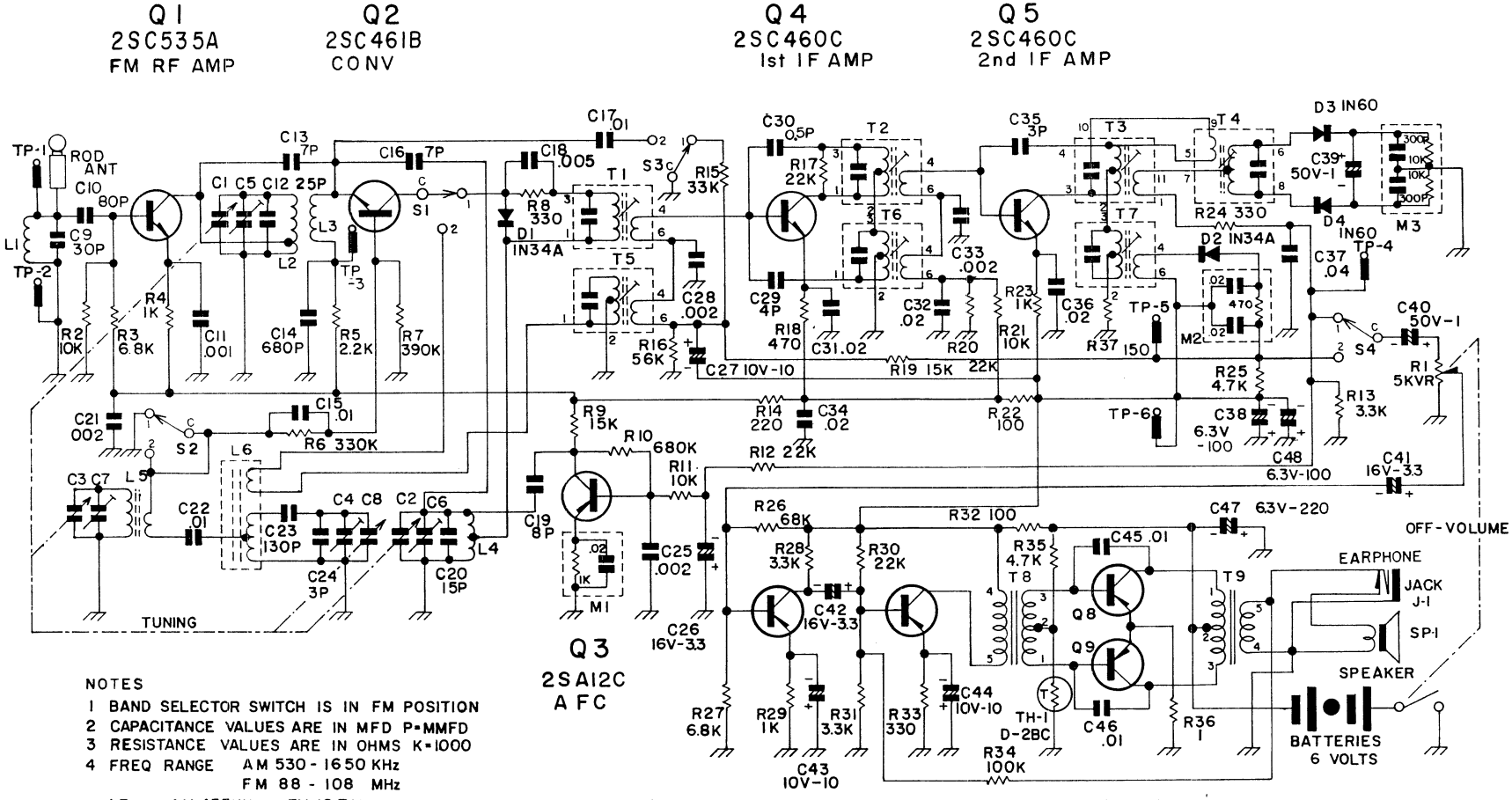
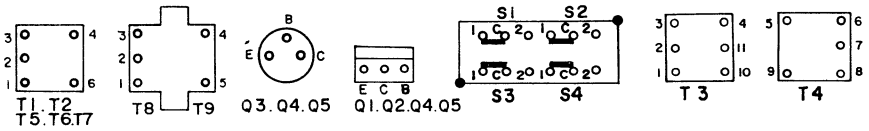
Figure 3 Printed Circuit Board (Bottom View)



NOTES

1 BAND SELECTOR SWITCH IS IN FM POSITION
2 CAPACITANCE VALUES ARE IN MFD P=MMFD
3 RESISTANCE VALUES ARE IN OHMS K=1000
4 FREQ RANGE AM 530 - 1650 KHz
FM 88 - 108 MHz
I F AM 455KHz FM 10.7MHz

BOTTOM VIEW



TRANSISTOR VOLTAGE & STAGE (FX-184)

TR NO	TR	Coll V	Base V	Emitt V	STAGE
Q 1	2SC535A	4.3	1.65	0.95	FM RF AMP
Q 2	2SC461B	4.1 4.6	2.1 1.8	1.5 1.4	FM CONV AM CONV
Q 3	2SC12C	3.2	1.4	0.8	AFC
Q 4	2SC460C	4.6 5.0	1.65 0.8	1.0 0.21	FM 1ST IF AMP AM 1ST IF AMP
Q 5	2SC460C	5.0 5.2	1.8 1.8	1.2 1.15	FM 2ND IF AMP AM 2ND IF AMP
Q 6	2SB75B	4.2	0.44	0.33	AUDIO AMP
Q 7	2SB75B	4.8	0.62	0.49	AUDIO DRIVE
Q 8	2SB77B	6	0.16	—	OUTPUT
Q 9	2SB77B	6	0.16	—	OUTPUT
D 1	IN34A				OVER LOAD
D 2	IN34A				AM DET
D 3	IN60				FM DET
D 4	IN60				FM DET

NOTES
1. Q1.Q2.Q4.Q5 VOLTAGE READINGS TO COMMON -B ARE MEASURED BY V.T.V.M. UNDER NO SIGNAL CONDITION
2. Q3.Q6.Q7.Q8.Q9 VOLTAGE READINGS TO COMMON GROUND(+) ARE MEASURED BY V.T.V.M. UNDER NO SIGNAL CONDITION

Figure 4 Schematic Diagram

PARTS LIST

RESISTORS

REF.NO.	PART NO.	DESCRIPTION
R1/SW1	1548280900	5K ohm, Pot., Volume Control/ On-Off Switch (8V-809)
R2	1545210321	10K ohm, ¼W (¼SU-10KK)
R3, R27	1545268221	6.8K ohm, ¼W (¼SU-6.8KK)
R4, R23	1545210221	1K ohm, ¼W (¼SU-1KK)
R5	1544222221	2.2K ohm, ¼W (¼SA-2.2KK)
R6	1545233429	330K ohm, 1/8W (1/8SU-330KK)
R7	1545239429	390K ohm, 1/8W (1/8SU-390KK)
R8	1545233129	330 ohm, 1/8W (1/8SU-330K)
R9, R19,	1545215321	15K ohm, ¼W (¼SU-15KK)
R10	1545268429	680K ohm, 1/8W (1/8SU-680KK)
R11	1545210329	10K ohm, 1/8W (1/8SU-10KK)
R12	1545222329	22K ohm, 1/8W (1/8SU-22KK)
R13	1545233229	3.3K ohm, 1/8W (1/8SU-3.3KK)
R14	1545222129	220 ohm, 1/8W (1/8SU-220K)
R15	1544233329	33K ohm, 1/8W (1/8SA-33KK)
R16	1545256321	56K ohm, ¼W (¼SU-56KK)
R17, R20, R30	1545222321	22K ohm, ¼W (¼SU-22KK)
R18	1544247129	470 ohm, 1/8W (1/8SA-470K)
R21	1544210329	10K ohm, 1/8W (1/8SA-10KK)
R22, R32	1545210121	100 ohm, ¼W (¼SU-100K)
R24, R33	1544233121	330 ohm, ¼W (¼SA-330K)
R25	1544247221	4.7K ohm, ¼W (¼SA-4.7KK)
R26	1545268321	68K ohm, ¼W (¼SU-68KK)
R28, R31	1545233221	3.3K ohm, ¼W (¼SU-3.3KK)
R29	1545210229	1K ohm, 1/8W (1/8SU-1KK)
R34	1545210421	100K ohm, ¼W (¼SU-100KK)
R35	1545247221	4.7K ohm, ¼W (¼SU-4.7KK)
R36	1544210821	1 ohm, ¼W (¼SA-1K)
R37	1545215121	150 ohm, ¼W (¼SU-150K)

*All resistors are 10%, Carbon type.

CAPACITORS

REF.NO.	PART NO.	DESCRIPTION
C1, C2, C3, C4, C5, C6 C7, C8	1560241700	Variable Tuning Gang with Trimmers (VC-417)
C9	1552230817	30PFD, 50V, 5%, Discap (D-5-308J)
C10	1552280817	80PFD, 50V, 5%, Discap (D-5-808J)
C11	1552601300	.001MFD, 50V, Discap (D-5-106P)
C12	1552225817	25PFD, 50V, 5%, Discap (D-5-258J)
C13, C16	1552270927	7PFD, 50V, 5PFD, Discap (D-5-709D)
C14	1552268782	680PFD, 500V, 10%, Discap (D-50-687K)
C15, C17,	1552606900	.01MFD, 50V, Discap(D-5-105P)
C18	1552600600	.005MFD, 30V, Discap (D-3-506P)
C19	1552280937	8PFD, 50V, 1PFD, Discap (D-5-809F)
C20	1552215817	15PFD, 50V, 5%, Discap (D-5-158J)
C21, C25, C28, C33	1552601600	.002MFD, 50V, Discap(D-5-206P)
C22, C45, C46	1552210537	.01MFD, 50V, 20%, Discap (D-5-105M)
C23	1554213717	130PFD, 50V, 5%, Discap (T-5-137J)
C24, C35	1552230917	3PFD, 50V, .25PFD, Discap (D-5-309C)
C26, C41, C42	1661233323	3.3MFD, 16V, Electrolytic (CU-1.6-333R)
C27, C43, C44	1661210212	10MFD, 10V, Electrolytic (CU-1-102Q)
C29	1552240917	4PFD, 50V, .25PFD, Discap (D-5-409C)
C30	1552205917	.5PFD, 50V, .25PFD, Discap (D-5-059C)
C31, C32, C34, C36	1552601000	.02MFD, 50V, Discap(D-5-205Z)
C37	1552600900	.04MFD, 50V, Discap(D-5-405Z)
C38, C48	1661210111	100MFD, 6.3V, Electrolytic (CU-06-101Q)
C39, C40	1661210327	1MFD, 50V, Electrolytic (CU-5-103R)
C47	1661222111	220MFD, 6.3V, Electrolytic (CU-06-221Q)

COILS AND TRANSFORMERS

L1	1507259700	Coil, FM Antenna (7L-597C)
L2	1507262300	Coil, FM RF (7L-623C)
L3	1507295400	Coil, Emitter Choke (7L-954)
L4	1507259800	Coil, FM Oscillator (7L-598C)
L5	1508223710	Coil, AM Antenna (8L-237A10)
L6	1508232900	Coil, AM Oscillator (8L-329B)
T1	1507287800	Transformer, 1st FM IF (7IF-878)
T2	1507288700	Transformer, 2nd FM IF(7IF-887)
T3	1507288800	Transformer, 3rd FM IF (7IF-888)
T4	1507287900	Transformer, FM Detector (7IF-879)
T5	1507287700	Transformer, 1st AM IF (7IF-877)
T6	1507288500	Transformer, 2nd AM IF(7IF-885)
T7	1507288600	Transformer, 3rd AM IF(7IF-886)
T8	1516280900	Transformer, Audio Driver (6T-809)
T9	1517283900	Transformer, Audio Output (7T-839)

SEMICONDUCTORS

Q1	1522222710	Transistor, FM RF Amplifier (2SC535)
Q2	1527210721	Transistor, Converter (2SC461)
Q3	1522210131	Transistor, AFC (2SA12)
Q4, Q5	1527210831	Transistor, IF Amplifier (2SC460)
Q6	1522211221	Transistor, Audio Amplifier (2SB75B)
Q7	1522211221	Transistor, Audio Driver (2SB75B)
Q8, Q9	1522211328	Transistor, Audio Output (2SB77B) (Matched Pair)
D1	1522270101	Diode, FM AVC (1N34A)
D2	1522270101	Diode, AM Detector (1N34A)
D3, D4	1522270208	Diode, FM Detector (1N60) (Matched Pair)
TH1	1522280231	Thermistor, AOC (D-2B)

PARTS LIST

REF.NO.	PART NO.	DESCRIPTION

PACKAGED CIRCUITS

M1	1656633200	Capristor	(PRC-332)
M2	1656630300	Capristor	(PRC-303)
M3	1656640300	Capristor	(PRC-403)

MISCELLANEOUS

	1103238300	Cabinet, Front	(3CAB-4214A)
	1103438300	Cabinet, Back	(3CAB-4214B)
	1109224100	Knob, Tuning	(9K-241)
	1109224200	Knob, Volume Control	(9K-242)
	1120286100	Pointer, Dial	(SISIN-4214)
	1121375100	Dial	(DIAL-4214)
	1193287700	Belt, Carrying	(BELT-4176)
	1303236800	Control Panel	(PCB-4214)
	1353278000	Drum, Dial Cord	(DP-780)
	1530213300	Jack, Earphone	(J-133)
	1533242600	Switch, Band Selector	(34S-26)
	1570218900	Speaker	(6P-81H)
	1571224958	Antenna, Telescopic Rod	(XROD-A249)
	1593240200	Earphone	(3MR-402)

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